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EXAMINER	
SENFI, BEHROOZ M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/085,684	SHEN ET AL.	
	Examiner	Art Unit	
	Behrooz Senfi	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-19 and 21-29* is/are pending in the application.

4a) Of the above claim(s) *13 and 20* is/are withdrawn from consideration.

5)☒ Claim(s) *19 and 21-24* is/are allowed.

6)☒ Claim(s) *1-12,14-18 and 25-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/17/2007 has been entered.

Claims 13 and 20 have been canceled.

Response to Arguments

2. Applicant's arguments filed 04/17/2007 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 – 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 2002/0126752) in view of Vetro et al (US 6,671,322).

Regarding claim 1, Kim '752 teaches, a method for reducing the resolution of media data (e.g. video transcoding for reducing the HD resolution to SD resolution as shown in fig. 3, page 3, paragraph 0043 of Kim), comprising;

accessing compressed input data for a frame of a plurality of frames (please see, fig. 3, MPEG-2 compressed bit-stream of plurality of pictures/frames "e.g. MPEG-2 compressed bit-stream, comprises compressed data for a frame/pictures, page2, paragraphs 0020 – 0021 and page 3, paragraph 0048" being accessed by the processing unit 103 of Kim), wherein the frame is at a first resolution and comprises a plurality of macro-blocks (please see;.figs. 3 – 6B, abstract, lines 6 – 8 and page 3, paragraphs 0043 and 0047 of Kim, where the input comprises high resolution frames/picture "e.g. HD" and comprises a plurality of macro-blocks), wherein the plurality of macro-blocks comprises a plurality of subsets of macro-blocks that are to be encoded as a single output macro-block (please see; figs. 6A – 6B, subsets of macro-blocks "e.g. MB1 – MB4" to be encoded as a single output macro-block "e.g. single output macro-block shown in figs. 6A and 7, page 7, paragraph 0116 of Kim);

selecting a data processing function according to the number of macro-blocks in a subset of the plurality of subsets that are characterized as intra-coded, wherein the selecting is performed for each of the plurality of subsets (please see; fig. 6B, the selection of intra or inter data processing function is accordance to the result of the number of intra-coded macro-blocks in each subset of the plurality of subsets "e.g. intra-coded macro-blocks in a subset, such as MB1, MB2, MB3, MB4 and page 4, paragraph 0053 and page 7, paragraphs 0130 – 0131, of Kim);

if less than all of the macro-blocks in the subset are characterized as intra-coded (i.e. as shown in fig. 6B, subset MB1, includes five intra coded "e.g. less than all") and if the number of macro-blocks in the subset characterized as intra-coded satisfies a threshold (please see; fig. 5 of Kim, step 503, shows that if the number of macro-blocks in the subset characterized as intra-coded greater than 3 "e.g. satisfies a threshold 3", page 7, paragraph 0132 of Kim) down-sampling/downscaling the subset of macro-blocks to generate the output macro-block comprising compressed down-sampled/downscaled data at a second resolution that is reduced relative to the first resolution (please see; fig. 3, transcoding operation "e.g. down-sampling/downscaling" of macro-blocks to generate compressed down-sampled/downscaled "e.g. reduced" data at a second resolution "e.g. SD output" relative to first resolution "e.g. HD input", page 3, paragraphs 0043 and 0047 of Kim), wherein the accessing, selecting and down-sampling/downscaling are performed prior to transmitting (please see; fig. 3, page 1, paragraph 0002 of Kim, the transcoding operation as shown in fig. 3; including accessing, selecting and down-sampling are performed prior to transportation/storage).

Although; Kim teaches transmitting the output macro-block comprising compressed down-sampled/downscaled data, as discussed above.

Kim does not explicitly states transmitting "output to a wireless device over the wireless network".

Vetro '322 in the same field of video transcoding teaches, transmitting output data to a wireless device over the wireless network (please see; fig. 7, transmitting network 703, col. 6, lines 29 - 35).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teaching of Kim in accordance with the teaching of Vetro for broadcasting data over the wireless network, by minimizing the contention for scarce resources, as suggested by Vetro (i.e. col. 1, lines 53 – 56).

Regarding claim 2, Kim teaches motion compensation process "e.g. generating motion vectors" in video transcoding for downscaling video to a lower resolution (i.e. figs. 7 and 8, MC units 16 and 39, page 4, paragraph 0063).

Kim does not explicitly states "generating motion vectors for the frame at the second resolution using the motion vectors from the input data".

Vetro in the same field of video transcoding (i.e. fig. 10, motion vector mapping 1020, col. 8, lines 53 – 56) teaches generating motion vectors for the frame at the second resolution "e.g. reduced resolution" using the motion vectors from the input data "e.g. full resolution".

In view of the above, it would have been obvious to one having ordinary skill in the art to at the time of the invention was made to modify the video transcoding apparatus of Kim in accordance with the teaching of Vetro by performing motion vector mapping from the input data "e.g. full resolution" to yield a set of reduced resolution "e.g. second resolution" motion vectors, to provide a balance between complexity and quality in the transcoder and to compensate for drift to provide better up-sampling techniques during transcoding, as suggested by Vetro (i.e. col. 4, lines 30 – 34 of Vetro).

Regarding claim 3, Kim teaches motion compensation process “e.g. generating motion vectors” in video transcoding for downscaling video to a lower resolution (i.e. figs. 5 and 7 - 8, MC units 16 and 39, page 4, paragraph 0063 of Kim), Kim further teaches selecting motion compensating vector by using average and median values of the motion vectors (i.e. figs. 5 and 7 - 8, page 4, paragraph 0056 and pages 7 - 8, paragraphs 0136 – 0139 of Kim).

Kim does not explicitly states “motion vectors for the frame at the second resolution are generated by averaging the motion vectors from the input data”.

Vetro in the same field of video transcoding (i.e. fig. 10, motion vector mapping 1020, col. 4, lines 3 - 10) teaches motion vectors for the frame at the second resolution “e.g. reduced resolution” are generated by averaging the motion vectors from the input data “e.g. full resolution”.

In view of the above, it would have been obvious to one having ordinary skill in the art to at the time of the invention was made to modify the video transcoding apparatus of Kim in accordance with the teaching of Vetro by performing motion vector mapping from full to reduce motion vectors by applying averaging or median filters, to provide a balance between complexity and quality in the transcoder and to compensate for drift to provide better up-sampling techniques during transcoding, as suggested by Vetro (i.e. col. 4, lines 30 – 34 of Vetro).

Regarding claim 4, the combination of Kim and Vetro teaches, wherein the input data are compressed according to a discrete cosine transform based compression scheme (i.e. MPEG-2 input bit-stream/data as shown in fig. 3 of Kim, are compressed

according to a discrete cosine transform compression scheme), wherein the input data comprises discrete cosine transform (DCT) coefficients (i.e. fig. 3 of Kim shows the input data stream is compressed according to MPEG-2, which comprises discrete cosine transform (DCT) coefficients "e.g. page 1, paragraph 0007").

Regarding claim 5, the combination of Kim and Vetro teaches, generating an output data stream comprising macro-block at the second resolution (please see; fig. 3, page 3, paragraph 0043, where indicates video transcoder for transforming HD "high resolution" to a second resolution as output "e.g. SD, low/standard resolution" of Kim) and determining a bit-rate for the output data stream using the DCT coefficients from the input data (please see; fig. 3, bit-rate control unit 600 controls the quantization "fig. 3, unit 33" using DCT "fig. 3, unit 32" to determine the bit-rate for the output data stream, page, 8, paragraph 0151 and page 11, paragraph 0198 of Kim).

Regarding claim 6, the combination of Kim and Vetro teaches, wherein data are encoded according to a first compression scheme "e.g. input compressed MPEG-2 bit-stream" and the output data stream are encoded according to a second compression scheme (i.e. the transcoding operation as illustrated in fig. 3 of Kim).

Regarding claim 7, the combination of Kim and Vetro teaches, wherein the media data are selected from the group consisting of: video data, audio data, image data, graphic data and web page data (i.e. fig. 3, MPEG-2 bit-stream, page 5, paragraphs 0079 – 0081 of Kim, indicating MPEG-2 video and audio bit stream).

5. Claims 8 – 12, 14 – 18 and 25 – 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 2002/0126752) in view of Brusewitz (US 2003/0021345) further in view of Vetro et al (US 6,671,322).

Regarding claim 8, Kim '752 teaches, a method for reducing the resolution of media data (e.g. video transcoding for reducing the HD resolution to SD resolution as shown in fig. 3, page 3, paragraph 0043 of Kim), comprising;

accessing input data comprising compressed data for a plurality of macro-blocks (please see, fig. 3, compressed MPEG-2 bit-stream/input, which includes compressed data, being accessed by the video transcoder, page 4, paragraph 0043, and includes plurality of macro-blocks "e.g. figs. 3 – 6B, abstract, lines 6 – 8, page 2, paragraph 0023, page 3, paragraph 0043 of Kim), wherein the plurality of macro-blocks comprises a plurality of subsets of macro-blocks that are to be encoded as a single output macro-block (please see, figs. 6A - 7, subsets of macro-blocks "e.g. MB1 – MB4" to be encoded as a single output macro-block "e.g. single output/downscale macro-block as shown in figs. 6A and 7, page 7, paragraph 0116 of Kim) and wherein a macro-block is characterized as a first coding type if the macro-block is dependent on a macro-block from a reference frame and is otherwise characterized as a second coding type (please see; figs. 5 and 6B of Kim, where shows the macro-blocks are characterized as "Intra coded macro-blocks, which are independent", and "Inter coded macro-blocks, which are dependent to another macro-block", thus are consider as the first and second coding type of macro-block);

selecting a data processing function according to the number of macro-blocks in a subset of the plurality of subsets that are characterized as the first coding type and also according to the number of macro-blocks in the subset that are characterized as the second coding type (i.e. as shown in figs. 5 and 6B, the selection of intra or inter data processing function is according to the result of number of intra-coded or inter-coded macro-blocks in a subset of the plurality of subsets "e.g. intra-coded and inter-coded macro-blocks in a subset, such as MB1, MB2, MB3, MB4, as shown in fig. 6B" and page 4, paragraph 0053, page 7, paragraphs 0128 – 0131 of Kim),

generating the output macro-block from the plurality of macro-blocks using the data processing functions providing a reduce resolution relative to the input data (i.e. as shown in fig. 3, transcoding "e.g. down-sampling/downscaling" of macro-blocks to generate compressed down-sampled/downscaled "e.g. reduced" data at a second resolution "e.g. SD output" relative to first resolution "e.g. HD input", page 3, paragraphs 0043 and 0047), wherein the accessing, selecting and down-sampling/downscaling are performed prior to transmitting (i.e. as shown in fig. 3 of Kim, the transcoding operation; including accessing, selecting and down-sampling are performed prior to transportation/storage).

Although; Kim teaches processing functions "e.g. transcoding operation" for down-sampling/downscaling of the compressed input data "e.g. fig. 3, MPEG-2 input bit-stream" to generate down-sampled/downscaled compressed output data, as discussed in the above.

Kim does not explicitly states, at least one of the processing functions comprises down sampling compressed data in DCT domain, as specifies in the claim.

Brusewitz in the same field (i.e. fig. 3, downscaling unit 132, page 1, paragraphs 0010 and 0013) teaches the above subject matter, downscaling compressed data in DCT domain.

In view of the above it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video processing apparatus as taught by Kim in accordance with the teaching of Brusewitz, which results in a considerable decrease in decoding complexity requiring less memory and lower CPU power usage as suggested by Brusewitz (i.e. fig. 3, abstract, lines 5 – 7, page 1, paragraphs 0008 and 0009 of Brusewitz). Furthermore; Although, Kim teaches transmitting the output macro-block comprising compressed down-sampled/downscaled data, as discussed above.

Furthermore; Kim does not explicitly states transmitting "output macro-block to a wireless device over the wireless network" as specifies in the claim.

Vetro '322 in the same field of video transcoding teaches, transmitting output macro-block/data to a wireless device over the wireless network (please see; fig. 7, transmitting network 703, col. 6, lines 29 - 35).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teaching of Kim in accordance with the teaching of Vetro for broadcasting data over the wireless network,

by minimizing the contention for scarce resources, as suggested by Vetro (i.e. col. 1, lines 53 – 56).

Regarding claim 9, the combination of Kim, Brusewitz and Vetro teaches, determining a coding type for the output macro-block according to the number of macro-blocks characterized as the first coding type and the number of macro blocks characterized as the second coding type (please see; fig. 6B of Kim, shows coding type, such as intra coded and/or inter-coded macro-blocks, which consider as first coding type "e.g. intra and/or inter" and second coding type) and selecting the data processing function according to the coding type of the output macro-block (please see; figs. 5 and 6B, the selection of intra or inter data processing function is according to the result of number of intra-coded macro-blocks in each subset of the plurality of subsets "e.g. intra-coded macro-blocks in a subset of the plurality of subsets, such as MB1, MB2, MB3, MB4, that are characterized as intra-coded, page 4, paragraph 0053 and page 7, paragraphs 0128 – 0131 of Kim).

Regarding claim 10, the combination of Kim, Brusewitz and Vetro teaches, constructing a prediction macro-block for each macro-block in the subset of macro-blocks by applying motion compensation to a respective macro-block in a reference frame (i.e. fig. 3, motion compensation units 103 and 39 of Kim), wherein the constructing comprises a decoding function such that the predicted macro-blocks comprises decompressed data (i.e. fig. 3, decoder 103 of Kim), down-sampling predicted macro-block to generate a down-sampled macro-block (i.e. fig. 3 of Kim, the transcoding function, which includes down-sampling/downscaling unit 300 for

downscaling the macro-blocks, as discussed earlier in the above action) and encoding the down-sampled/downscaled macro-block to generate the output macro-block (i.e. fig. 3 of Kim, encoder 202, for encoding downscaled macro-blocks).

Regarding claim 11, the combination of Kim, Brusewitz and Vetro teaches, wherein, if all of the plurality of macro-blocks are characterized as the second coding type "e.g. figs. 5 and 6B illustrates coding type of macro-blocks and page 7, paragraph 0128 – 0132 of Kim", the data processing functions comprises; down-sampling the subset of macro-blocks to generate the output macro-block comprising compressed down-sampled data (please see, figs. 3 of Kim, thus the output macro-block "e.g. output of the transcoder" comprises compressed down-sampled data at a reduced resolution "e.g. SD").

Regarding claim 12, the combination of Kim, Brusewitz and Vetro teaches, down-sampling/downscaling "e.g. transcoding" of the input data to generate down-sampled/downscaled compressed output data, as shown in fig. 3, of Kim, and discussed in the claim 1 above; and generating decompressed down-sampled data (please see; fig. 3, page 8, paragraph 0151, the output of unit 300 of Kim, is a decompressed down-sampled data) and up-sampling the decompressed down-sampled data (please see; fig. 8, page 4, paragraph 0063, lines 6 - 9 of Kim).

Kim does not explicitly states "decoding the compressed down-sampled data" as specifies in the claim.

Brusewitz in the same field (i.e. fig. 3, downscaling/down-sampling unit 132, page 2, paragraphs 0027 of Brusewitz) teaches the above subject matter, decoding the compressed down-sampled data.

In view of the above it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video processing apparatus as taught by Kim in accordance with the teaching of Brusewitz, which results in a considerable decrease in decoding complexity requiring less memory and lower CPU power usage as suggested by Brusewitz (i.e. fig. 3, abstract, lines 5 – 7, page 1, paragraphs 0008 and 0009 of Brusewitz).

Regarding claim 14, the combination of Kim, Brusewitz and Vetro teaches, wherein if the number of macro-blocks in the subset characterized as the second coding type satisfies a first threshold (e.g. figs. 5 and 6B, step 503, shows that if the number of macro-blocks in the subset characterized as second coding type "e.g. intra-coded" greater than 3 "e.g. satisfies a threshold 3", page 7, paragraph 0132) the data processing functions comprises; constructing a prediction macro-block for each macro-block in the subset of macro-blocks by applying motion compensation to a respective macro-block in a reference frame (i.e. fig. 3, the loop of units 13 – 16 construct prediction macro-block for each macro-block in the subset of macro-blocks by applying motion compensation unit 103 of Kim), wherein the constructing comprises a decoding function such that the predicted macro-block comprises decompressed data (i.e. fig. 3, decoding function 103 of Kim, for decoding the macro-block, where the construct prediction macro-block "e.g. in the loop of units 13 – 16" would comprise decompressed

data), encoding each predicted macro-block (i.e. fig. 3, encoder 202 of Kim, for encoding predicted macro-block) and down-sampling predicted macro-blocks (i.e. fig. 3, the down-sampling take place in unit 300 for down-sampling predicted macro-block, e.g. outputted from the loop units 13 – 16 of fig. 3 of Kim) and macro-blocks characterized as the second coding type to generate the output macro-block comprising compressed down-sampled data (i.e. figs. 5 and 6B of Kim, shows characterizing macro-blocks coding type "e.g. intra-coded and/or inter-code macro-blocks" to generate the output macro-block comprising compressed down-sampled data "e.g. as illustrated in fig. 3 of Kim, the output of the transcoding operation comprises compressed down-sampled data").

Regarding claim 15, the combination of Kim, Brusewitz and Vetro teaches, down-sampling/downscaling "e.g. transcoding" of the input data to generate down-sampled/downscaled compressed output data, as shown in fig. 3, of Kim, and discussed in the claim 1 above; and generating decompressed down-sampled data (please see; fig. 3, page 8, paragraph 0151, the output of unit 300 of Kim, is a decompressed down-sampled data) and up-sampling the decompressed down-sampled data (please see; fig. 8, page 4, paragraph 0063, lines 6 - 9 of Kim).

Kim does not explicitly states "decoding the compressed down-sampled data" as specifies in t6he claim.

Brusewitz in the same field (i.e. fig. 3, downscaling/down-sampling unit 132, page 2, paragraphs 0027) teaches the above subject matter, decoding the compressed down-sampled data.

In view of the above it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video processing apparatus as taught by Kim in accordance with the teaching of Brusewitz, which results in a considerable decrease in decoding complexity requiring less memory and lower CPU power usage as suggested by Brusewitz (i.e. fig. 3, abstract, lines 5 – 7, page 1, paragraphs 0008 and 0009 of Brusewitz).

Regarding claim 16, the combination of Kim, Brusewitz and Vetro teaches, wherein the input data comprise motion vectors (i.e. fig. 3, page 1, paragraph 0007 of Kim) comprising; generating a motion vector for the output macro-block by averaging the motion vectors (i.e. fig. 5, units 510, 505, page 4, paragraph 0056 of Kim).

Regarding claim 17, the combination of Kim, Brusewitz and Vetro teaches, wherein the input data are compressed according to a discrete cosine transform based compression scheme (i.e. MPEG-2 input bit-stream/data as shown in fig. 3 of Kim, are compressed according to a discrete cosine transform compression scheme).

Regarding claim 18, the combination of Kim, Brusewitz and Vetro teaches, generating a quantization parameter for the output macro-block using quantization parameters for the plurality of macro-blocks (please see; fig.3, control unit 600, including the activity and quantizing parameter generating/calculating units 602 – 604 and 33, page 2, paragraph 0031, page 3, paragraph 0047 and page 4, paragraph 0060 of Kim).

Regarding claim 25, Kim '752 teaches, a computer readable medium having computer readable program code embedded herein for causing a computer system to

perform a method (i.e. the transcoding operation and the operational flowchart of the video compression as illustrated in figs. 3 and 5 are computer implemented, wherein the program code/software when embedded on to a computer readable medium for causing a computer to perform the operational flowchart of the video compression, as shown in fig. 5 of Kim, would have been necessitated) comprising;

accessing compressed input data residing in a buffer (e.g. fig. 2, input memory 101 “e.g. input buffer”, receiving the compressed MPEG-2 bit-stream, being accessed by the processing unit 103 of Kim), the compressed input data comprising compressed data for a frame of a plurality of frames (please see, fig. 3, MPEG-2 compressed bit-stream thus comprises compressed data for a frame/pictures, page2, paragraphs 0020 – 0021 and page 3, paragraph 0048 of Kim) wherein the frame is at a first resolution and comprises a plurality of macro-blocks (please see; Kim, figs. 3 – 6B, abstract, lines 6 – 8, page 3, paragraphs 0043 and 0047, where the compressed MPEG-2 bit stream includes frames/pictures at first resolution “e.g. HD resolution” and comprises plurality of macro-blocks), wherein the plurality of macro-blocks comprises a plurality of subsets of macro-blocks that are to be encoded as a single output macro-block (please see; Kim, figs. 6A – 6B, subsets of macro-blocks “e.g. MB1 – MB4” to be encoded as a single output macro-block “e.g. single output/downscale macro-block as shown in figs. 6A and 7, page 7, paragraph 0116);

selecting a data processing function according to the number of macro-blocks in a subset of the plurality of subsets that are characterized as intra-coded, wherein the selecting is performed for each of the plurality of subsets (please see; fig. 6B of Kim, the

selection of intra and/or inter data processing function is according to the result of number of intra-coded macro-blocks in each subset of the plurality of subsets "e.g. intra-coded and/or inter-coded macro-blocks in a subset of the plurality of subsets, such as MB1, MB2, MB3, MB4" page 4, paragraph 0053 and page 7, paragraphs 0130 – 0131 of Kim);

if less than all of the macro-blocks in the subset are characterized as intra-coded (please see; fig. 6B, subset MB1, includes five intra coded "e.g. less than all") and if the number of macro-blocks in the subset characterized as intra-coded satisfies a threshold (please see; fig. 5 of Kim, step 503, shows that if the number of macro-blocks in the subset characterized as intra-coded greater than 3 "e.g. satisfies a threshold 3", page 7, paragraph 0132 of Kim), generating compressed down-sampled data by down-sampling/downscaling the subset of macro-blocks, the compressed down-sampled/downscaled data at a second resolution that is reduced relative to the first resolution to generate the output macro-block (please see; fig. 3, transcoding operation "e.g. down-sampling/downscaling" of macro-blocks to generate compressed down-sampled/downscaled "e.g. reduced" macro-block/data at a second resolution "e.g. SD output" relative to first resolution "e.g. HD input", page 3, paragraphs 0043 and 0047 of Kim);

up-sampling the decompressed down-sampled data to generate decompressed at a resolution corresponding to the first resolution (please see; fig. 8, page 4, paragraph 0063, lines 6 - 9 of Kim), the decoding and the up-sampling performed only if the decompressed data are needed as a reference for another frame (please see; fig. 8,

page 11, paragraph 0198 of Kim, indicating predictive motion compensation and up-sampling is carried out on decompressed P or B pictures to restore to its original state), wherein the accessing, selecting, down-sampling and up-sampling are performed prior to transmitting (please see; as shown in fig. 8 of Kim, the transcoding operation; including accessing, selecting, down-sampling and up-sampling are performed prior to transportation/storage).

Kim does not explicitly states "decoding the compressed down-sampled data" to generate decompressed down-sampled data at the second resolution, as specifies in the claim.

Brusewitz in the same field (i.e. fig. 3, downscaling/down-sampling unit 132, page 2, paragraphs 0027 of Brusewitz) teaches the above subject matter, decoding the compressed down-sampled data, to generate decompressed down-sampled data at the second resolution.

In view of the above it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video processing apparatus as taught by Kim in accordance with the teaching of Brusewitz, which results in a considerable decrease in decoding complexity requiring less memory and lower CPU power usage as suggested by Brusewitz (i.e. fig. 3, abstract, lines 5 – 7, page 1, paragraphs 0008 and 0009 of Brusewitz). Furthermore; Although, Kim teaches transmitting the output macro-block comprising compressed down-sampled/downscaled data, as discussed in the above action.

Furthermore; Kim does not explicitly states transmitting "output to a wireless device over the wireless network".

Vetro '322 in the same field of video transcoding teaches, transmitting output data to a wireless device over the wireless network (please see; fig. 7, transmitting network 703, col. 6, lines 29 - 35).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teaching of Kim in accordance with the teaching of Vetro for broadcasting data over the wireless network, by minimizing the contention for scarce resources, as suggested by Vetro (i.e. col. 1, lines 53 – 56).

Regarding claim 26, the combination of Kim, Brusewitz and Vetro teaches, accessing motion vectors for the frame at the first resolution (i.e. fig. 3, MC processing unit 16 for the frame at first resolution, of Kim).

Kim does not explicitly states "deriving motion vectors for the frame at the second resolution from the motion vectors from the frame at the first resolution".

Vetro in the same field of video transcoding (i.e. fig. 10, motion vector mapping 1020, col. 8, lines 53 – 56) teaches generating motion vectors for the frame at the second resolution "e.g. reduced resolution" using the motion vectors from the input data "e.g. full resolution".

In view of the above, it would have been obvious to one having ordinary skill in the art to at the time of the invention was made to modify the video transcoding apparatus of Kim in accordance with the teaching of Vetro by performing motion vector

mapping from the input data "e.g. full resolution" to yield a set of reduced resolution "e.g. second resolution" motion vectors, to provide a balance between complexity and quality in the transcoder and to compensate for drift to provide better up-sampling techniques during transcoding, as suggested by Vetro (please see; col. 4, lines 30 – 34 of Vetro).

Regarding claim 27, the combination of Kim, Brusewitz and Vetro teaches, motion compensation process "e.g. generating motion vectors" in video transcoding for downscaling video to a lower resolution (i.e. figs. 5 and 7 - 8, MC units 16 and 39, page 4, paragraph 0063 of Kim), Kim further teaches selecting motion compensating vector by using average and median values of the motion vectors (i.e. figs. 5 and 7 - 8, page 4, paragraph 0056 and pages 7 - 8, paragraphs 0136 – 0139 of Kim).

Kim does not explicitly states "motion vectors for the frame at the second resolution are generated by averaging the motion vectors for the frame at the first resolution".

Vetro in the same field of video transcoding (i.e. fig. 10, motion vector mapping 1020, col. 4, lines 3 - 10) teaches motion vectors for the frame at the second resolution "e.g. reduced resolution" are generated by averaging the motion vectors from the input data "e.g. full resolution".

In view of the above, it would have been obvious to one having ordinary skill in the art to at the time of the invention was made to modify the video transcoding apparatus of Kim in accordance with the teaching of Vetro by performing motion vector mapping from full to reduce motion vectors by applying averaging or median filters, to

provide a balance between complexity and quality in the transcoder and to compensate for drift to provide better up-sampling techniques during transcoding, as suggested by Vetro (i.e. col. 4, lines 30 – 34 of Vetro).

Regarding claim 28, the combination of Kim, Brusewitz and Vetro teaches, wherein the input data are compressed according to a discrete cosine transform based compression scheme (i.e. MPEG-2 input bit-stream/data as shown in fig. 3 of Kim, are compressed according to a discrete cosine transform compression scheme), wherein the input data comprises discrete cosine transform (DCT) coefficients (i.e. fig. 3 of Kim shows the input data stream is compressed according to MPEG-2, which comprises discrete cosine transform (DCT) coefficients “e.g. page 1, paragraph 0007” of Kim).

Regarding claim 29, the combination of Kim, Brusewitz and Vetro teaches, accessing quantization parameters for the frame at the first resolution and deriving quantization parameter for the frame at the second resolution from the quantization parameters for the frame at the first resolution (please see; fig. 3, control unit 600 of Kim, thus the controller adapted to determine a quantization step size for a frame at the second resolution according to quantization parameters from the quantization parameters for the frame at the first resolution/input data “e.g. fig.3, control unit 600, varying a step size of a quantizing unit 33 using a result of the calculation, page 2, paragraph 0031, page 4, paragraph 0060 and page 5, paragraph 0086” of Kim).

Allowable Subject Matter

6. Claims 19 and 21 – 24 are allowed.

7. The following is an examiner's statement of reasons for allowance: The prior art of the record fails to anticipate or fairly suggest the specific of "wherein the subset of macro-blocks is directed by the mode selector to the down-sampler if less than all of the macro-blocks in the subset are characterized as intra-coded and if the number of macro-blocks characterized as intra-coded exceeds a threshold, wherein otherwise the subset of macro-blocks is directed by the mode selector to the relay, along other limitations" as specifies in the claim.

Claims 21 – 24 are allowed with respect to dependency to allowable independent claim 19.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Behrooz Senfi whose telephone number is 571-272-7339. The examiner can normally be reached on M-F 7:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Behrooz Senfi
Examiner
Art Unit 2621